10/044657
ASW
4-17-02

TITLE OF THE INVENTION

Holding device with at least one operating mount

BACKGROUND OF THE INVENTION

1. The Technical Field

**[0001]** The present invention relates to a holding device with at least one operating mount to which fastening means that are stressed upon traction can be fixed, as well as with a securing unit for the mounting of the holding device in a stationary mount, whereby the securing unit has at least two stopping catches distanced from one another which, in the mounted condition, engage with corresponding edge sections.

2. The Prior Art

**[0002]** Such types of holding devices are generally known in multiple forms, particularly as holding clips. It can be problematic with such types of holding clips that, upon high tensile loads from a correspondingly engaging fastening means, these pull out from the mount.

**[0003]** It would be desirable to create a holding device of the type stated above which offers a secure restraint of the holding device in the corresponding mount, even upon greater tensile loads.

SUMMARY OF THE INVENTION

**[0004]** The present invention is directed to an improved holding device wherein the stopping catches are positioned on elastically movable support units which are connected with one another by means of a transverse section that is dimensionally stable in at least the mounted condition, and that the extension of the mount between the edge sections is smaller than the corresponding dimension of the transverse section. The formulation that the transverse section is dimensionally stable in at least the mounted condition takes into consideration that the transverse section can, on the one hand, be designed to be dimensionally stable in itself and, on the other hand, that it can also be indirectly dimensionally stable in the mounted position, because of the fact that an additional, form-locking support body correspondingly engaging over a broad surface carries out the corresponding dimensionally stable function of the transverse section. By means of the solution in accordance with the invention, it is guaranteed that the swiveling points of the support units, which are defined by the length of the transverse section, are in every case positioned -- in relation to an imaginary central longitudinal axis of the holding device -- further to the outside than the corresponding undercut areas of the stopping catches. During tensile loads on the holding device in the mounted condition, torques acting externally are consequently active on the support units, which torques press the stopping catches and the support units in a positively locking manner, from the inside to the outside, against the edge sections of the mount, so that, in the event of a tensile load on the holding device, the catching forces of the stopping catches in the mount are strengthened.

**[0005]** In a particularly advantageous manner, the holding device in accordance with the invention is used in the load space of passenger vehicles, whereby corresponding rails can be provided in the base of the

vehicle or in the side walls, which rails can be provided with the mounts for the fixing of the holding device.

**[0006]** In development of the invention, the form-locking transverse section, the support unit, and the stopping catches are designed as a one-part bracket element of plastic. By that means, a simple and cost-favorable design can be achieved, whereby the corresponding requirements provided for the specific case of application can also be fulfilled through the material selection of the plastic.

**[0007]** In a further development of the invention, the at least one operating mount is integrally formed as a single part with the bracket element. In this design, the entire holding device consequently consists only of a single, one-part component, which is preferably manufactured from plastic. By that means, a holding device, which can be applied in a versatile manner, is created.

**[0008]** In a further development of the invention, the bracket element has as its operating mount an attachment eyelet, which is formed by a free space below the transverse section and between the support units. Loops or hooks of corresponding fastening means can be drawn through or secured to this attachment eyelet.

**[0009]** In a further development of the invention, the form-locking transverse section has a greater material thickness than the support unit. By that means, an inherent stability of the transverse section, which is increased relative to the support units, is achieved by particularly simple means. The increased inherent stability of the transverse section is necessary in order to achieve the function of a holding device, which is self-blocking upon a tensile load.

**[0010]** In a further development of the invention, the mount has a rotationally asymmetrical penetrating cross-section, and the stopping catches are adjusted to the penetrating cross-section in a form-locking manner in such a way that the stopping catches are, in the mounted condition, held in

the mount -- in relation to a central axis of the mount -- in a manner secured against twisting. By that means, a mounting of the holding device in a precisely positioned manner is made possible. In the mounted position, the holding device is consequently blocked independently of the tensile load that arises. The penetrating cross-section is preferably formed as a polygon, and the stopping catches are correspondingly adjusted to the edges of the polygonal penetrating cross-section. One particularly preferred example of implementation has a quadrilateral penetrating cross-section. The stopping catches are accordingly shaped correspondingly rectangular in cross-section.

**[0011]** In a further development of the invention, the operating mount is integrally formed with a support element separate from the bracket element, which support element is provided with a two-sided support area for support on the edge sections of the mount, and the bracket element overlaps with the support element in the mounted condition. By that means, a two-part holding device is created, by means of which expanded possibilities are provided, particularly for the design of the operating mount.

**[0012]** In a further development of the invention, the support element has a support body section which, in the mounted condition, forms a broad-surfaced, form-locking support for the transverse section of the bracket element. The function in accordance with the invention, namely, that the catching force of the stopping catches is, upon tensile load, reinforced in the mount, is consequently achieved, in this development, by means of an indirect reinforcement of the transverse section by means of the support body section.

**[0013]** In a further development of the invention, the bracket element is spatially integrated into the support element. By that means, a space-saving and optically attractive development is created. Through the spatial integration, a reciprocal form-locking support and reinforcement between the bracket element and the support element, which improve the function of the holding device, is additionally created.

**[0014]** In a further development of the invention, the support element is produced from plastic. Because of that, the two-part holding device can also be manufactured in a cost-favorable manner and in high unit numbers, through which its application is particularly promising for the area of motor vehicles.

**[0015]** Additional advantages and characteristics of the invention proceed from the claims, as well as from the following description of preferred examples of implementation of the invention which are depicted in the diagrams.

BRIEF DESCRIPTION OF THE DRAWINGS

**[0016]** Figure 1 is a perspective representation of a cut-away section of a load space base of a motor vehicle, in which a securing net with a form of implementation of a holding device in accordance with the invention is attached to the load space base.

**[0017]** Figure 2 is an enlarged representation of a mounting- or dismounting process of the holding device in accordance with Figure 1.

**[0018]** Figure 3 illustrates the holding device in accordance with Figures 1 and 2, in the mounted condition.

**[0019]** Figure 4 is an enlarged, perspective representation of an additional form of implementation of a holding device in accordance with the invention, which likewise serves for the attachment of function points in the internal space of a motor vehicle.

**[0020]** Figure 5 is a longitudinal section through the holding device in accordance with Figure 4.

**[0021]** Figure 6a is an enlarged, perspective representation of an additional form of implementation of a holding device in accordance with the invention.

**[0022]** Figure 6b is a schematic representation of a view from above, of a penetrating aperture in a load space base for the mount of a holding device in accordance with Figure 6a.

**[0023]** Figure 7 is a reduced representation of the holding device in accordance with Figure 6a in a lateral view.

**[0024]** Figure 8 illustrates the holding device in accordance with Figure 7, in a frontal view.

**[0025]** Figure 9 illustrates the holding device in accordance with Figures 7 and 8, in a sectional representation along the sectional line IX-IX in Figure 8.

**[0026]** Figure 10 illustrates the holding device in accordance with Figures 7 to 9, in a view from below.

[0027] Figure 11 illustrates the holding device in accordance with Figures 7 to 10, in a view from above.

DETAILED DESCRIPTION OF THE INVENTION

**[0028]** While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will be described herein in detail, a specific embodiment, with the understanding that the present invention is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

**[0029]** A holding device 6 in accordance with Figures 1 to 3 serves for the fixing of functional parts in a load space 1 of a motor vehicle, preferably of a passenger vehicle. A securing net 4, which can be clamped onto the load space base 1 is provided in the present as a function part, which securing net has a loop 5 on its corners, which loop serves as a fastening means for the securing net 4 and can be connected with the holding device 6. The other corners of the securing net 4 are also secured, by means of corresponding fastening loops and holding devices 6, to the load space base 1.

**[0030]** The holding device 6 is, in the example of implementation depicted in accordance with Figures 1 to 3, designed as a one-part plastic component in the form of a holding clip. The holding clip has, in its upper area, a dimensionally stable transverse section 7 that is curved in an arc shape, which transverse section is continued, on its ends, in a manner free of recess, in two downwardly-projecting support units 8. The support units 8 are provided, on their lower ends, with stopping catches 9 positioned opposite to one another and pointing outwardly. The stopping catches 9 are each positioned at a distance below the broad-surfaced support side of each support unit 8, whereby the support units 8 are, in the mounted condition, supported with their support sides on the corresponding surface of the load space base 1. One constricted section 10 each remains between the stopping catches 9 and the support sides, which constricted section is adjusted, in its dimensions, to a mount 3 in the load space base 1, which

mount is designed as a penetrating passage. The mount 3 is designed as a circular penetrating passage and is provided in a rail 2 which closes snugly, in its upper side, with the load space base 1 and is, on the chassis side, firmly connected with the chassis of the motor vehicle.

[0031] The internal sides of the support unit 8 and of the transverse section 7 form an approximately circular penetrating passage, which represents an attachment eyelet for the loop 5. The holding clip 6 is consequently designed as a bracket element open to the bottom, so that a corresponding loop 5 can, in a simple manner, be secured in the attachment eyelet by way of one of the two support units 8, and can also be removed again in the same manner.

[0032] As is evident from Figure 3, the length of the transverse section 7 proceeding in the plane of the diagram, which transverse section can also be termed its "width", is significantly greater than the diameter of the mount 3 -- that is to say, the distance of the two edge sections 11 positioned opposite to one another. Since the transverse section 7 is designed in a dimensionally stable manner, the support units 8 are, upon the presence of corresponding pressure loads, elastically moved from outside to inside at approximately the height of the swiveling points $S_2$. The thinnest cross-section of each support unit 8 is also located at the height of these swiveling points $S_1$, $S_2$, so that an elastic movability around this weakened area is provided. The diameter of the constricted sections 10 -- considered in the unstressed condition of the holding device 6 -- is only slightly less than the diameter of the mount 3, so that the holding device 6 is, in the mounted condition, seated in the mount 3 in a manner essentially free of clearance. The distance of the stopping catches 9 from the lower support sides of the support unit 8, which support sides are not depicted in further detail, is also adjusted to the thickness of the rail 2, so that a freedom of clearance results in the direction of height. As is additionally evident in Figure 3, the lower support sides are additionally somewhat beveled so that, in the mounted

condition, a clamping on the edge sections 11 of the mount 3 arises for the holding clip 6 in the area of the constricted sections 10. Since the distance of the imaginary swiveling points $S_1$, $S_2$ of the support units 8 is significantly greater than the distance of the imaginary points $S_3$, $S_4$, which approximately correspond to the diameter of the mount 3 and the constricted sections 10 positioned opposite to one another, a torque is, because of the corresponding torques and forces arising upon a tensile load on the holding clip 6, exerted upwardly onto the support units 8 in the area of the stopping catches 9, each time outwardly, so that the catching force of the stopping catches 9 engaging with the edge sections 11 of the mount 3 is increased. For a renewed dismounting of the holding clip 6, a pressure load is easily exerted from the outside -- preferably by hand -- onto the support unit 8 positioned opposite, through which the support units 8 are pressed inwardly, and the holding clip 6 can be removed upwardly in accordance with Figure 2. In order to make a corresponding mounting and dismounting possible, the distance of the external contours of the stopping catches 9 positioned opposite to one another in the condition of being pressed together and applied against one another is, in accordance with Figure 2, slightly less than the diameter of the mount 3.

**[0033]** A holding device 6a, which is designed as a two-part holding clip, is provided in the example of implementation in accordance with Figures 4 and 5. The holding clip 6a is composed of a bracket element, similar to the holding clip 6 in accordance with Figures 1 to 3, as well as of a support element 12 which is provided with operating mounts in the form of four hook extensions 14. The support element has a foundation that is cylindrical in sections on the external circumference, with which foundation the hook extensions 14 are integrally formed in a single part in the upper area. The support element 12 is slotted in the middle over its entire length, whereby the approximately semi-cylindrical halves of the support element 12 that arise are only connected rigidly with one another and in a single part in an

upper area by way of a support body section 16 which is designed in a block- or square shape. The support element 12 has a gradated, base-side support area 13, which is supported externally on the edge of the mount 3. The holding device 6a can then, in a manner analogous to the holding clip 6, be mounted and dismounted in the same manner in the mounts 3 of the rail 2 of the load space base 1 in accordance with Figure 1, as has already been described by means of Figures 1 to 3 for the case of the holding clip 6. In order to achieve the catching connection of the support element 12 in the mount 13, the bracket element 7a, 9a, 15, which is manufactured as a separate component, is spatially integrated into the support element 12. Both the support element 12, as well as also the bracket element 7a, 9a, 15, are manufactured from a suitable plastic. The function of the bracket element 7a, 9a, 15 essentially corresponds to that of the holding clip 6, so that reference can be made in the following to Figures 1 to 3. It is an essential difference, however, that the inherent stability of the transverse section 7a of the bracket element is achieved, in at least a supplementary manner, by the support body section 16, which is adjusted in its external contour to the inner sides of the bracket element in the area of the transverse section 7a, as well as the upper parts of the support unit 15, in such a manner that it is applied snugly and over a broad surface against these internal sides. The lower areas of the support unit 15, which are also provided with corresponding gripping contours for the elastic pressing together by hand, are likewise designed rigidly in themselves, so that the area of the support unit 15 that is weakened and forms the imaginary swiveling point still results at approximately the height of the support body section 16 or slightly below the support body section 16. It is also essentially possible to configure the transverse section 7a, in the example of implementation in accordance with Figures 4 and 5, in a manner that is not particularly dimensionally stable, since the support body section 16 indirectly achieves, through its form-locking fitting, the inherent stability of the transverse section 7a as soon as

the bracket element is displaced onto the square-shaped support body section 16 between the two halves of the support element 12. For the displacing and detaching of the bracket element relative to the support body section 16, the bracket element is preferably displaced from the side onto the upper and lower longitudinal sides of the support body section 16, and then rotated downwardly by 90°. Upon the removal, the upward turning back by 90° obviously takes place first and, after that, the lateral removal.

**[0034]** In the example of implementation in accordance with Figures 4 and 5, it is consequently essential that the support body section 16 has a width -- in relation to the plane of the diagram -- that is greater than the diameter of the mount 3 and the distance of the constricted sections above the stopping catches 9a to one another, in order to thereby achieve the desired increasing of the catching force upon tensile loads on the support element 12. In order to achieve a continuous placement contact of the constricted sections onto the edge sections of the mount 3, it can be supplementally provided, in the example of implementation in accordance with Figures 4 and 5, to insert an elastically flexible filling body into the support element 12 between the support units 15 positioned opposite to one another, which filling body continuously exerts a certain elastic pressure towards the outside on the support unit 15, and thereby on the stopping catches 9a as well.

[0035] A holding device in the form of a one-part holding clip 6b is designed similarly to the holding clip 6 in accordance with Figures 1 to 3. Areas or parts, which have the same function, are provided with the same reference numerals, with only the addition of the letter "b". The holding clip 6b also has a rigid transverse section 7b, with which two support units 8b, which project in parallel to one side of the transverse section 7b, are connected on both sides. The support units 8b each make a transition, by way of a one-part ledge, which is not depicted in further detail, into a catching element in the form of a stopping catch or of a catching hook 9b. Both of the stopping catches are, as is particularly evident from Figure 8, positioned below the support units 8b and displaced inwardly in relation to the alignment of the support unit 8b to the center. The ledges connecting the stopping catches 9b and the support units 8b in a single part with one another consequently project inwardly towards the center in relation to the support units 8b. Each ledge is provided with a centering aid 17, 18, which centering aids are composed of a centering bar 18 on the one ledge and a centering mount 17 on the other ledge. Each ledge has the centering bar 18 over half of its width and the centering mount 17 laterally adjacent to that. As is clearly evident from Figures 7 and 9 or 10, the width of the stopping catches 9b is reduced relative to the ledge. Slot-shaped or groove-shaped constricted sections 10b result between the ledge and the stopping catches 9b.

[0036] As is evident in Figures 6-a and 10, the stopping catches 9b each have a rectangular base surface. Gripping surfaces, by means of which the holding clip 6b can, in the area of its support unit 8b, be elastically pressed together in such a manner that both of the stopping catches 9b are moved towards one another, are provided laterally externally on the support units 8b. Inside a load space base 2b, which is designed to be quadrangular, or, as in the present case, square, the cross-sections and base surfaces of

the stopping catches 9b are adjusted to a penetrating cross-section of a mount 3b. Corresponding edge sections 11b bound the mount 3b.

**[0037]** For the application of the holding clip into the mount 3b, both of the support units 8b are pressed inwardly. The width of the stopping catch 9b is slightly less than the lateral length of the edge sections 11b, so that the stopping catches 9b can, in the pressed-together condition of the support unit 8b, be guided through the mount 3b. As soon as the lower side of the ledge of the holding clip 6b is supported on the surface of the load space base 2b, the force of pressure onto the support unit 8b can be eliminated. The support units 8b press back outwardly into their unstressed resting position. By that means, both of the stopping catches 9b engage, on the two sides positioned opposite to one another, with the lower sides of the edge sections 11b positioned opposite to one another. The centering bars 18 and centering mounts 17 that are positioned in an alternating manner guarantee that, upon the pressing of the two support units 8b together, the stopping catches 9b are pressed together at the same height, so that an angular pressing together of the support unit 8b and of the stopping catches 9b, which would lead to a contacting of the two stopping catches 9b with one another in a manner displaced in height, is avoided. It is thus guaranteed that, upon the application, both of the stopping catches 9b engage with the corresponding edge sections 11b of the specific mount 3b in a uniform and reproducible manner. Since the constricted sections 10b are, in the mounted condition of the holding clip 6b, applied in a form-locking manner to the lateral edges of the edge sections 11b positioned opposite one another, a twisting of the holding clip 6b relative to its central vertical axis, which corresponds to the mounting axis, is excluded.

**[0038]** As is clearly evident from Figures 8 and 9, the form-stable cross-section 7b is provided with a greater thickness of material than the specific transition area to the support units 8b. By that means, one swiveling point each is defined, in a positive locking manner, for the elastic movability

of the support unit 8b on the external sides of the transverse section 7b. In the present case, the swiveling points are formed by horizontal swiveling axes, which are parallel with one another, in the area of transition to the specific support unit 8b, around which the ledge accommodating the support unit 8b, including the stopping catches 9b, and the ledge accommodating the centering aids 17, 18 can be swiveled inwardly in an elastic manner. In the unstressed resting condition, the support units 8b and the stopping catches 9b are positioned in accordance with the depiction in accordance with Figure 8.

**[0039]** The foregoing description and drawings merely explain and illustrate the invention, and the invention is not limited except insofar as the appended claims are so limited, as those skilled in the art who have the disclosure before them will be able to make modifications and variations therein without departing from the scope of the invention.